

**Notice of Allowability**

Application No.

10/040,621

Examiner

Yubin Hung

Applicant(s)

LIM ET AL.

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to RCE filed 12/12/2005.
2. ☒ The allowed claim(s) is/are 1-33 and 35 (re-numbered).
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some\* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

**DETAILED ACTION**

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 12, 2005 has been entered.

### EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Natalya Dvorson on January 18, 2006.

3. The application has been amended as follows:

**Replace claims 16, 17, 19, 25 and 33 with the following:**

Claim 16. The method of claim 15, wherein the texture features are expressed by a texture feature descriptor  $f_t(I_k)$ :

$$f_t(I_k) = \{(m_{k11}, \sigma_{k11}), (m_{k12}, \sigma_{k12}), \dots, (m_{k1M}, \sigma_{k1M}), (m_{k21}, \sigma_{k21}), \dots, (m_{kij}, \sigma_{kij}), \dots, (m_{kNM}, \sigma_{kNM})\}$$
 wherein  $m_{kij}$  is a mean value of a plurality of pixel values of the i-th frequency channel and the j-th orientation channel for a sample region  $I_k$ , and  $\sigma_{kij}$  is a deviation of the pixel values of the i-th frequency channel and the j-th orientation channel for the sample region  $I_k$ .

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Claim 17. The method of claim 16, wherein, in step (a2), the texture distance between each color vector of each region of the query image and each color vector of each sample region of each data image is calculated using:

$$d_t(I_1, I_2) = \sum_{i=1}^N \sum_{j=1}^M \left| \frac{m_{1ij} - m_{2ij}}{\sigma(m_{ij})} \right| + \sum_{i=1}^N \sum_{j=1}^M \left| \frac{\sigma_{1ij} - \sigma_{2ij}}{\sigma(\sigma_{ij})} \right|$$

where  $\sigma(m_{ij})$  and  $\sigma(\sigma_{ij})$  are the standard deviations for all  $m_{ij}$  and  $\sigma_{ij}$ , respectively.

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Claim 19. The method of claim 18, wherein step (pb-1) comprises:

(pb-1-1) taking a rectangle  $M(i, j)$  having largest side lengths for a sample region, wherein  $0 \leq i \leq n$  and  $0 \leq j \leq m$ ;

(pb-1-2) dividing the rectangle  $M(i, j)$  into a plurality of sub-rectangles each having a  $l \times l$  size; and

(pb-1-3) obtaining a grid map for the sample region using a predetermined function which outputs 1 if all the divided grids belong to the sample region, and otherwise, outputs 0, the predetermined function expressed by:

$$M_{grid}(i, j) = \begin{cases} 1 & \text{if } p_{ij}(x, y) \in I_k \text{ for } \forall (x, y) \\ 0 & \text{otherwise} \end{cases}$$

wherein  $0 \leq i \leq \left\lfloor \frac{n}{l} \right\rfloor - 1$ ,  $\left\lfloor n/l \right\rfloor$  being a result of applying the floor function,  $0 \leq j \leq \left\lceil \frac{m}{l} \right\rceil - 1$

where  $\left\lceil m/l \right\rceil$  is a result of applying the ceiling function,  $0 \leq x \leq l - 1$ ,  $0 \leq y \leq l - 1$ , and  $p_{ij}(x, y)$  is a point that belongs to rectangle  $M(il + x, jl + y)$ .

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Claim 25. The method of claim 23, wherein the predetermined weighting factor to the color distance is determined by:

$$\omega_c = 1 - \sum_{i=1}^N p_{qi} \log_{10} \left( \frac{1}{p_{qi}} \right)$$

wherein  $p_{qi}$  is a percentage of an i-th representative color of one of the first regions of the query image.

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Claim 33. The method of claim 23, wherein step (b-2) comprises projecting the color distances and the texture distances onto a 1-dimensional distance space using:

$$d(I_q, I_1) = W_c d_c(I_q, I_1) \left( 1 + \frac{2}{\pi} \tan^{-1} \frac{d'_t(I_q, I_1)}{d_c(I_q, I_1)} \right) + W_t d'_t(I_q, I_1) \left( 1 + \frac{2}{\pi} \tan^{-1} \frac{d_c(I_q, I_1)}{d'_t(I_q, I_1)} \right)$$

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wherein  $W_c = \frac{\omega_c}{\omega_c + \omega_t}$  and  $W_t = \frac{\omega_t}{\omega_c + \omega_t}$ , where  $\omega_c$  and  $\omega_t$  are weighing factors of the color

distances and texture distances respectively, where  $d_c(I_q, I_1)$  and where  $d'_t(I_q, I_1)$  represent normalized distance functions for two image regions based on their color and texture vectors, respectively.

***Allowable Subject Matter***

4. Claims 1-33 and 35 are allowed.

5. The following is an examiner's statement of reasons for allowance:

5.1 Regarding independent claims 1 and 2, closest art of record Muraka discloses using the query image to determine the weighting factors. It does not, however, teach or suggest using regions from both the query image and the data image for this purpose.

6. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Contact Information***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (571) 272-7451. The examiner can normally be reached on 7:30 - 4:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Yubin Hung  
Patent Examiner  
January 20, 2006



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